

METHOD AND APPARATUS FOR PROVIDING SIMULATED PHYSICAL  
INTERACTIONS WITHIN COMPUTER GENERATED ENVIRONMENTS

ABSTRACT OF THE DISCLOSURE

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A method and apparatus for providing force feedback to a user operating a human/computer interface device and interacting with a computer-generated simulation. In one aspect, a computer-implemented method simulates the interaction of simulated objects displayed to a user who controls one of the simulated objects manipulating a physical object of an interface device. The position of the simulated object, as provided within the simulation and as displayed, is mapped directly to the physical position of the user object. This mapping is broken under conditions that are effective to provide force feedback to the user which imparts a physical sensation corresponding to the interaction of the simulated objects. In another aspect, a ball simulated ball object interacts with a user-controlled simulated object in a simulation to allow the user to utilize a wide range of physical skill and dexterity in interacting with the simulation. In another aspect, a simulation apparatus provides a display device such as one or more display screens or a projection device, and which also provides an intuitive mechanical interface device for the user to skillfully and dexterously manipulate objects within a computer-generated simulation.